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ABSTRACT

A study assessed the effect of the use of reasoning message strategies on (1) a generally accepted goal of instruction (critical thinking) and (2) the affective behavior of students (attitudes toward the instruction). Subjects, 68 college students enrolled in journalism/mass communication classes, participated in one of three treatment groups that used either declarative sentence, question, or outline reasoning guides developed specifically for use with their textbooks. The students were trained in the use of the guides, which they used throughout a 15-week semester. In addition, they were pretested and posttested on a critical thinking measure and an attitude survey. Mean grade point averages were also collected. Results indicated that in the cognitive domain, the sentence and question guides were effective in developing critical thinking skills in the journalism/mass communication content areas. In the affective domain, the data indicated no significant attitude difference among the groups. There was, in fact, a significant positive correlation across the treatments toward the guides, the classroom atmosphere, and the teaching approach. Together the findings suggest that receiver-centered strategies based on the discovery theory of learning--one that encourages participation, self-awareness, and informed guessing--foster a positive relationship between growth in cognition and affective behavior. (FL)

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Cognitive and Attitudinal Effects of Reasoning Message Strategies

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Cognitive and Attitudinal Effects
of Reasoning Message Strategies

Abstract

This study assessed the relationship between message strategies, i.e., reasong guides, and (1) a generally accepted goal of instruction, i.e., critical thinking, and (2) affective behavior, i.e., attitudes toward the instruction.

The independent variables were 2 receiver-centered reasoning guides: one type employed declarative sentences; a second, questions. Both took students through a hierarchical thinking process which introduced them to application, analysis, synthesis, and/or evaluation of basic mass communication concepts and principles and related those cognitive processes to problem solving. The third guide, a topical outline, was the control.

The 2 dependent variables were students' mean difference scores on the Watson-Glaser Critical Thinking Appraisal (WGCTA), mean course grade points and mean attitude inventory scores.

In the cognitive domain, the data indicated the hierarchical reasoning guides--especially the simulation sentences--are an effective message strategy for developing critical thinking skills in journalism/mass communication content areas. With both cognitive measures, mean difference scores on the Watson-Glaser Critical Thinking Appraisal and mean course grades, the declarative sentence message strategy was significantly more effective than either the question or the outline strategy. Using only the mean course grades, the question message strategy was significantly more effective than the non-hierarchical outline strategy.

In the affective domain, the data indicated no significant attitude difference among the three treatments. On the contrary, there was a significant positive correlation--across the three treatments--toward the guides, the classroom atmosphere, and the teaching approach. This is especially interesting since students had to invest significant amounts of time and effort in using the guides. The open-ended comments on the attitude inventory reflected that, but not grudgingly.

Also important was the finding that students (receivers) perceived the development and introduction of the message strategies as a positive indicator of the instructor's (source's) interest in them and their progress.

Together these findings suggest receiver-centered strategies based on the discovery theory of learning--one that encourages participation, self-awareness and informed guessing--foster a positive relation between growth in cognition and affective behavior.

Cognitive and Attitudinal Effects of

Reasoning Message Strategies

Subject area specialists at the college level have recently begun to develop and evaluate strategies to teach reasoning skills in their disciplines. These scholars believe critical thinking is content specific. That is, the skills required to solve a problem are intrinsic to the situation that raises the problem. According to McPeck (1981, p. 161): "... it is crucial to recognize that the specific ingredients of critical thinking will differ according to task and subject, and that it comprises neither any specific set of skills nor 'logical' skills."

Furedy and Furedy (1979), for instance, reported that an honors thesis research course in experimental psychology improved students' ability to think critically by designing into the format adversarial and collaborative student interaction. Giroux (1978) showed how the pedagogy of writing and critical thinking are linked dialectically and illustrated a writing-history model designed to help students think critically about the meaning of history. Economist Browne (Browne, Haas, and Keeley, 1978) reported the development of a critical thinking 'rubric' that, more effectively than expert-designed, general tests, evaluates whether students understand and are able to utilize the critical thinking process. And Smith (1977) found active student participation, peer interaction, and faculty encouragement significantly and positively related to improved critical thinking levels in 12 classes evenly divided among the humanities, social sciences and natural sciences.

Most journalism and mass communication educators would probably agree that developing the higher level cognitive skills of application, analysis, synthesis, evaluation, and problem-solving--defined here as critical thinking--is a primary objective of their curriculum. But, while such educators have advanced a plethora

of engaging ideas aimed at improving their students' reasoning, they have reported little experimental research to assess the effectiveness of their instructional strategies (Smith, 1980).

Instructional strategies encompass the traditional elements of the communication process: source, encoder, message, channel, receiver, decoder, feedback, effects. According to Scott and Wheeless (1977, p. 505), they are "intended to maximize the fidelity of communication, through the negotiation of meaning. They employ message strategies which will facilitate the acquisition of cognitive, affective, and behavioral skills among students."

The experiment reported here was designed, first, to test the effectiveness of three message strategies in helping students (receivers/decoders) learn to think critically about media performance (cognitive effect), and second, to assess how students' attitudes (affective effect) toward the course and the instructor (source/encoder) were affected by these strategies (messages), since, as Krathwohl, Bloom, and Masia (1964, p. 20) point out: "...under some conditions the development of cognitive behaviors may actually destroy certain desired affective behaviors.... Clearly there is need for conclusive experimentation and research on the relations between the two domains."

The independent variables in this experiment were three receiver-centered message strategies which required students to use different types of reasoning guides (Meiss, 1983). One type employed declarative sentences, a second, questions. Both took students through a hierarchical thinking process which introduced them to application, analysis, synthesis, and/or evaluation of basic mass communication concepts and principles and related those cognitive processes to problem-solving. The third type of guide, a topical outline, was the control treatment.

Berget (1973) indicates that instructional hierarchies, like those in the sentence and question guides, are particularly effective when dealing with interpretive and abstract materials, like those in many journalism and mass communication courses. Herber (1970) argues that employing declarative sentences in guides simulates the appropriate reasoning processes and allows students to experience guided reasoning as they use them. As a result, Herber says, students develop those critical thinking skills and a disposition to use them in other situations. Although Taba (1965), Frase and Schwartz (1975), Anderson and Biddle (1975), and Singer and Donlan (1980), among others, have reported success with various hierarchical questioning strategies, Herber maintains that, in order to answer hierarchical questions in reasoning guides, students must already possess the thinking skills, otherwise the questions merely test for the presence or absence of the particular cognitive skills. This study, therefore, sought to evaluate the relative effectiveness of message strategies using declarative sentences and questions.

The three dependent variables in this experiment were the students' mean difference scores on the Watson-Glaser Critical Thinking Appraisal (WGCTA, 1964), mean course grade points and mean attitude inventory scores. The WGCTA was used because it has national norms; is the only expert-designed, general test available in two forms, allowing the measuring of pre and post performance with the same instrument; and, is widely used in evaluative research on critical thinking programs. Further, the types of learning and levels of thinking contained in the declarative sentence and question guides are implicit in the WGCTA subsets: Inference, Interpretation; Deduction; Evaluation of Argument; Recognition of Assumption.

A 13-item attitude inventory was developed for this study, derived from the University of Illinois' Instructor and Course Evaluation System (ICES, 1977).

Specifically, this experiment investigated the following research questions:

(1) Will there be a significant difference in mean difference scores on the Watson-Glaser Critical Thinking Appraisal among the three treatments?

(2) Will there be a significant difference in mean course grade points among the three treatments?

(3) Will there be a significant difference in mean attitude inventory scores among the three treatments?

Procedure

A total of 102 college students enrolled in three sections of an introductory mass communications course participated in this experiment. Complete data from 86 students (35 males and 51 females) were obtained and analyzed.

There were no significant differences among the three sections prior to the experiment in terms of sex, age, race, class standing, group size, and critical thinking pretest scores.

The experiment involved three treatment groups, each employing different reasoning guides developed for use with the class textbook. The three treatments were: declarative sentence guides, question guides, and outline guides (control). These treatment guides were evaluated in advance for comparability by a panel of three doctoral students in reading education at another university.

The treatment guides were assigned randomly to one of the three course sections. Throughout the fifteen week semester, students received the appropriate guides for ten of the fifteen reading assignments and ten of the fifteen discussion sessions. Students were trained how to use the reasoning guides with the first three reading assignments and the first three times they were used for discussion.

Detailed user directions were printed on all guides.

The class met twice each week for ninety-minute sessions. All three treatment conditions were conducted in the same way. That is, reading assignments were made prior to the Tuesday lecture/media presentation and followed up on Thursday with a two-tier discussion, first in small groups, then with the entire class. Lectures supplemented, but did not duplicate the text assignments. The instructor spoke from detailed lecture notes, so that the information presented, examples used, and even anecdotes mentioned were held constant across the three treatments. The same instructor taught all three treatment sections.

A pretest and a posttest of the students' critical thinking skills using the WGCTA were conducted on the second and the final days of the semester respectively. Two forms of the test (YM and ZM) were used in a split-half random procedure. Students received the alternate form for the posttest.

Because the ZM Form of the WGCTA is more difficult than the YM Form, an adjustment of -6.6 was made to the pretest and posttest ZM scores (the average of the 8.55 pretest and the 4.61 posttest YM-ZM differential). A series of two-tailed t-tests were performed on the adjusted pretest and posttest mean scores on the WGCTA.

Mean difference scores were computed for each group based upon the adjusted pretest and posttest scores on the WGCTA and a series of one-way analysis of variance tests was performed on the difference means. Whenever the analysis of variance resulted in a significant F value, multiple ranges tests were performed on the difference means.

Mean course grade points for the three treatment groups were subjected to a series of two-tailed t-tests.

Attitude was measured by a 13-item attitude inventory administered on the final day of the class.

A series of two-tailed t-tests were performed on the attitude inventory group means.

Results

The purpose of this study was to assess the relationship between message strategies, i.e., reasoning guides, and (1) a generally accepted goal of instruction, i.e., critical thinking, and (2) affective behavior, i.e., attitudes toward the instruction.

Research Question 1 asked whether there would be a significant difference in mean difference scores on the Watson-Glaser Critical Thinking Appraisal among the three treatment groups.

Table 1 presents the results of the t-tests on the adjusted pre and posttest mean scores.

TABLE 1 ABOUT HERE

Since the difference mean is computed by subtracting the adjusted posttest mean score from the adjusted pretest mean score, a negative difference mean indicates an increase in ability as measured by the test. There was a significant positive increase in critical thinking ability for the Declarative Sentence Treatment group.

There was an increase, though slight and not significant, in measured critical thinking ability for the Question Treatment condition. Additionally,

there was a decrease, again slight and not significant, in measured critical thinking ability for the Outline (control) Treatment.

The analysis of variance indicated that there was a significant difference in difference means among the treatment groups, (F value = 5.892, df = 2, 83) P $\leq$ .004. The difference means were then subjected to a series of multiple ranges tests to account for the significance. Table 2 presents the results of these tests.

TABLE 2 ABOUT HERE

The Declarative Sentence Treatment difference mean was significantly different from that of the Question Treatment and that of the Outline (control) Treatment. There was no significant difference between the difference mean for the Question Treatment and that of the Outline (control) Treatment.

Research Question 2 asked whether there would be a significant difference in mean course grade points among the three treatments. A series of two-tailed t-tests were performed on the mean course grade points for the three treatment groups. The results indicated that the Declarative Sentence Treatment had a significantly higher mean course grade point than the Outline Treatment, ($t = -9.25$, $df = 57$), $P \leq .001$, and than the Question Treatment, ($t = 6.06$, $df = 53$), $P \leq .001$. The Question Treatment had a significantly higher mean course grade point than the Outline Treatment ($t = -2.76$, $df = 56$), $P \leq .008$. Mean course grades and standard deviations are reported in Table 3.

TABLE 3 ABOUT HERE

Research Question 3 intended to probe the effect of instructional strategies on student attitudes. Results of the two-tailed t-tests indicated no significant difference in the actual use of the guides among treatments. Nor was there a significant difference among the treatments in students' attitudes toward the guides, perception of classroom atmosphere and attitudes toward the teaching approach. Pearson correlation coefficients were computed to determine the relationship among these three variables across the three treatment conditions.

There were significant positive correlations between students' attitudes toward the guides and their perception of classroom atmosphere, $r = .3329$, $P \leq .002$, and their attitudes toward the teaching approach, $r = .8841$, $P \leq .001$. Further, there was a significant positive correlation between students' perception of classrom atmosphere and their attitudes toward the teaching approach, $r = .7350$, $P \leq .001$.

Summary and Conclusions

In the cognitive domain, the data support a yes to research questions one and two: hierarchical reasoning guides--especially the simulation sentences recommended by Herber--are an effective message strategy for developing critical thinking skills in journalism/mass communication content areas. With both cognitive measures, mean difference scores on the Watson-Glaser Critical Thinking Appraisal and mean course grades, the declarative sentence message strategy was significantly more effective than either the question or the outline strategy. Using only the mean course grades, the question message strategy was significantly more effective than the non-hierarchical outline strategy.

Another interesting finding on the relative effectiveness of these message strategies came in an open-ended attitude inventory item: "What did you like or dislike about the guides?" Across treatments, students said they liked the guides and generally for one or more of three reasons: they helped in identifying what the instructor thought was important; they helped in organizing the material and preparing for tests; they helped in understanding the textbook. But, the declarative sentence treatment group's responses also contained qualitatively different comments: "The guides brought ideas to mind that I wouldn't have thought of without looking at the guides." "They helped me see the ideas behind the reading that I otherwise would have missed." "They helped me integrate the material and talk about the issues." "When you were finished with the guides, you had an overall understanding of the chapters, rather than general impressions

here and there, or unmanageable lists, facts, and details."

In the affective domain, the data on research question three indicate no significant attitude difference among the three treatments. On the contrary, there was a significant positive correlation--across the three treatments--toward the guides, the classroom atmosphere, and the teaching approach. This is especially interesting since students had to invest significant amounts of time and effort in using the guides. The open-ended comments on the attitude inventory reflected that, but not grudgingly.

Also important was the finding that students (receivers) perceived the development and introduction of the message strategies as a positive indicator of the instructor's (source's) interest in them and their progress. This suggests a link between human communication and learning that other studies have noted as well (Scott and Wheeless, 1977, p. 496):

> "Evidently, positive perceptions of a communication source and perceived similarities between source and receiver have much the same influence inside the classroom as they do in any other social context. In this instance, however, the influence of receiver perceptions is manifest in his or her abilities to process information rather than in changed attitudes."

Together these findings suggest receiver-centered strategies based on the discovery theory of learning--one that encourages participation, self-awareness and informed guessing--foster a positive relation between growth in cognition and affective behavior.

We recommend future research draw on the growing body of instructional communication theory to identify what thinking skills may be desirable in specific journalism/mass communication courses and explore the cognitive, affective and behavioral effects of instructional strategies, not only message strategies, to determine whether we are doing what we think we are in our teaching.

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Table 1

Results of t-Tests on Adjusted
Pre and Posttest Mean Scores

	Declarative Sentence		Question		Outline	
	Pre	Post	Pre	Post	Pre	Post
Mean	67.5299	73.7973	69.6046	70.5400	69.4306	68.5026
S.D.	10.236	9.435	10.249	10.157	8.672	8.518
Diff. Mean	-6.2674*		-.9354		.9280	
t-value	-3.35		-.78		.63	
df	27		26		30	

*Significance probability P $\leq$ .002 (two-tailed)

Table 2

Results of Multiple Ranges
Test for Differences in Group Means

Group	Count	Mean	Standard Deviation
Declarative Sentence	28	6.2674*	9.9121
Question	47	.9354	6.2132
Outline (control)	31	- .9280	8.2101

*Significance probability $P \leq .05$

Table 3

Mean Course Grade Points
by Treatment Group

Group	Count	Mean	Standard Deviation
Declarative Sentence	28	3.5011	.432
Question	27	2.7300	.509
Outline (control)	31	2.3606	.507